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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/074,624	02/13/2002	Yoshikazu Nakayama	57A 3216	7347
7590 09/03/2004				
KODA & ANDROLIA 2029 Century Park East Suite 1430 Los Angeles, CA 90067-3024			EXAMINER JAGAN, MIRELLYS	
			ART UNIT 2859	PAPER NUMBER

DATE MAILED: 09/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/074,624

Applicant(s)

NAKAYAMA ET AL.

Examiner

Mirellys Jagan

Art Unit

2859

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/5/04.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-8 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Objections*

1. Claims 7 and 8 are objected to because of the following informalities:

In claim 7, "heat emitting probe" should be changed to --heat emitting body-- in line 3.

In claims 7 and 8, it is not clear how the thermal conductivity and temperature distributions are detected since these claims and their intervening claims fail to claim any element or means for detecting changes in radiant heat and resistance to detect the thermal conductivity and temperature distributions. Therefore, claims 7 and 8 appear to be reciting the intended use of the probe apparatus claimed in claim 5, which apparently has a structure that is capable of detecting changes in radiant heat and resistance to detect the thermal conductivity and temperature distributions. Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over the prior art disclosed by Applicant on pages 1-2 of the specification [hereinafter Prior Art] in view of U.S. Patent Application Publication 2002/0084410 to Colbert et al [hereinafter Colbert].

The Prior Art teaches a conventional heat-emitting probe comprising:

Art Unit: 2859

an AFM cantilever (2);  
a pyramid tip (8) protruding from the tip end of the cantilever;  
electrode films (5, 5c, 6, and 6c) provided on both side surfaces of the of the cantilever  
and the side surfaces of the pyramid tip (8); and

a control circuit connected to the electrode films, the circuit comprising a power supply  
(20) for supplying an electric current to the tip via the electrode films;

wherein the electric current is caused to pass between the electrode films by the power  
supply to heat the tip so that it emits heat while it is moved to scan (i.e., a scanning mechanism  
moves it) the surface of a recording medium to record information on the medium by forming a  
hole pattern in the surface (see figure 9).

The Prior Art does not disclose the probe having a conductive carbon nanotube probe  
needle fastened to the pyramid tip, the carbon nanotube needle having a heat emitting body  
attached to its outer circumferential surface, wherein the body and the needle are connected to  
the electrode films by lead wires connected thereto for receiving the electric current from the  
electrode films to heat the needle.

Colbert discloses an AFM probe comprising a cantilever having a pyramid tip thereon,  
wherein the tip has a conductive carbon nanotube probe needle fastened to the pyramid tip.  
Colbert teaches that is beneficial to provide a conventional pyramid tip of an AFM probe with a  
carbon nanotube since the small size of the nanotube allows the probe to sense, measure,  
analyze, and modify objects more accurately with nanometer resolution and nanometer  
dimensions (see paragraphs 3-5, 9, 11-13, and 37).

Art Unit: 2859

Referring to claims 1 and 2, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the probe of the Prior Art by fastening a conductive carbon nanotube probe needle to the pyramid tip, as taught by Colbert, in order for the probe to modify the medium more accurately with nanometer resolution and nanometer dimensions.

Furthermore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the probe of the Prior Art and Colbert by electrically connecting the conductive needle to the electrode films of the probe using conventional means such as wires and conductive material in order to heat the needle so that the new nano-sized tip can emit the heat needed to record the information on the medium.

Referring to claims 7 and 8, claims 7 and 8 recite are considered to recite the intended use of the claimed probe apparatus, as stated above in paragraph 1. A recitation of the intended use of the claimed invention, in this case the claimed probe apparatus, must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. Therefore, since the structure of the probe apparatus of the Prior Art and Colbert is capable of performing the intended use, then it meets these claims. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963).

#### ***Response to Arguments***

4. Applicant's arguments with respect to claims 1-8 have been considered but are moot in view of the new ground(s) of rejection.

***Conclusion***

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents and publications disclose a carbon nanotube tip for an AFM:

U.S. Patent 6,159,742 to Lieber et al

U.S. Patent 6,146,227 to Mancevski

U.S. Patent 6,528,785 to Nakayama et al

U.S. Patent Application Publication 2002/0112814 to Hafner et al

U.S. Patent Application Publication 2002/0122766 to Lieber et al

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mirellys Jagan whose telephone number is 571-272-2247. The examiner can normally be reached on Monday-Friday from 9AM to 4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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